USE OF TURBO-LIKE CODES FOR QAM MODULATION USING INDEPENDENT I AND Q DECODING TECHNIQUES AND APPLICATIONS TO xDSL MODEMS

5

ABSTRACT

A transmitter produces a modulated signal with forward error correction from an information bit stream in a QAM transmitter. The transmitter produces parity bit streams that correspond to an inputted

10   information bit stream using first and second concatenated coders interconnected by an interleaver. Subsets of the first and second parity bit streams are selected in accordance with a puncturing pattern. A variety of novel puncturing patterns providing various coding rates for various constellations are disclosed. The transmitter combines the selected subsets of said first and second parity bit streams with said information bit stream. A QAM symbol stream is produced by mapping a first subset of the combined bit streams to an I

15   dimension and mapping a second subset of the combined bit streams to a Q dimension. The QAM symbol stream is modulated to produce a modulated signal that is transmitted over a communication link. A complementary receiver is also disclosed. The puncturing pattern used in the transmitter may be adapted based on a performance metric determined in the receiver.